

Information Systems Standards Study

**Presented by
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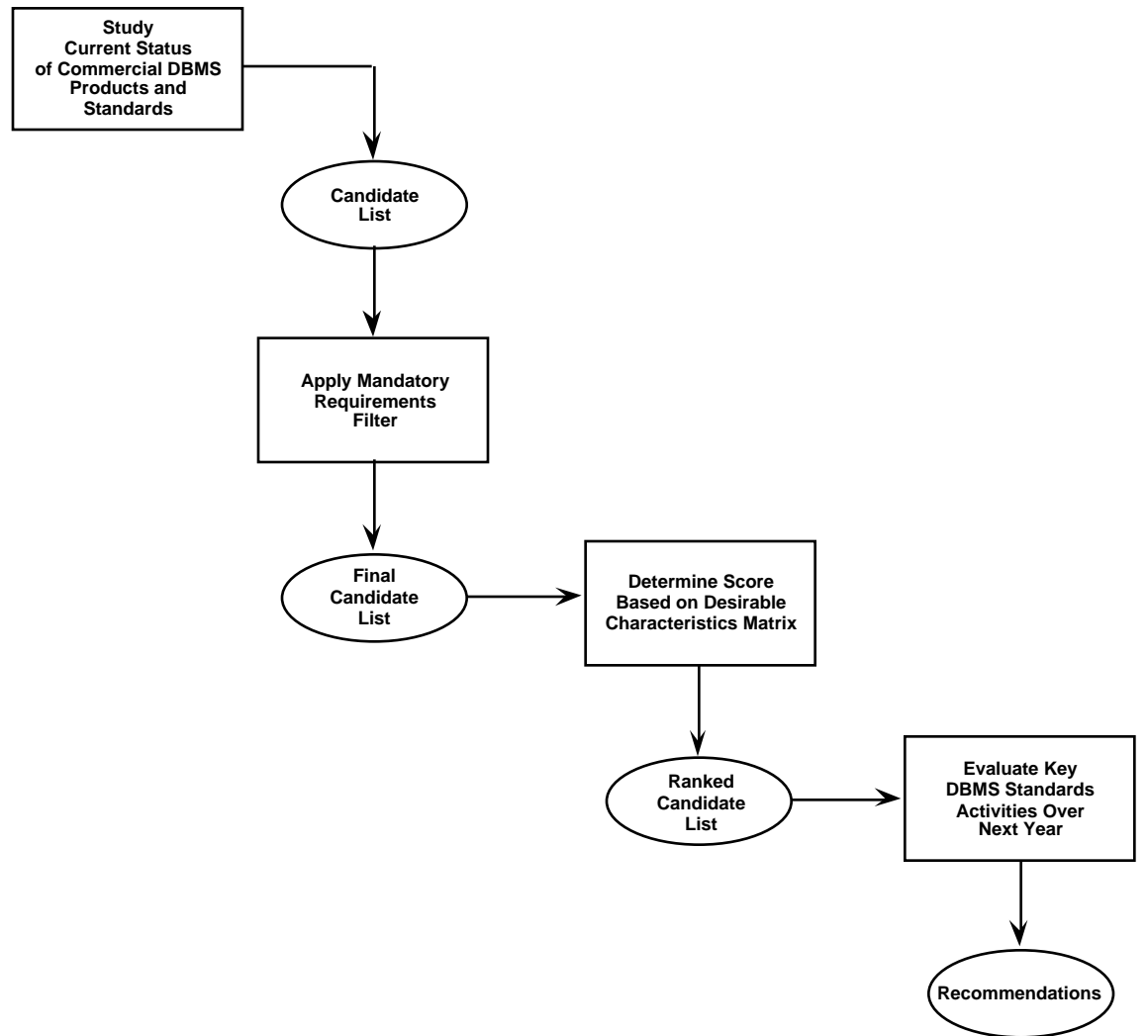
Outline of Presentation

- Scope
- ESQL Trade Study Methodology
- Query Language and Data Management Protocol Candidates
- ECS Data Management System Scenario
- Results of the ESQL Trade Study
- Observations and Recommendations

Scope of Presentation

- Initially, the Information System Standards Study project compiled a matrix of the current standards efforts that are applicable to EOSDIS
- On the basis of interaction with the ESDIS project Office, the area of Earth Science Query Languages (ESQL) and underlying data management protocols was selected for detailed study. In addition, the timeframe of interest was set to ECS Release B

ESQL Trade Study Methodology



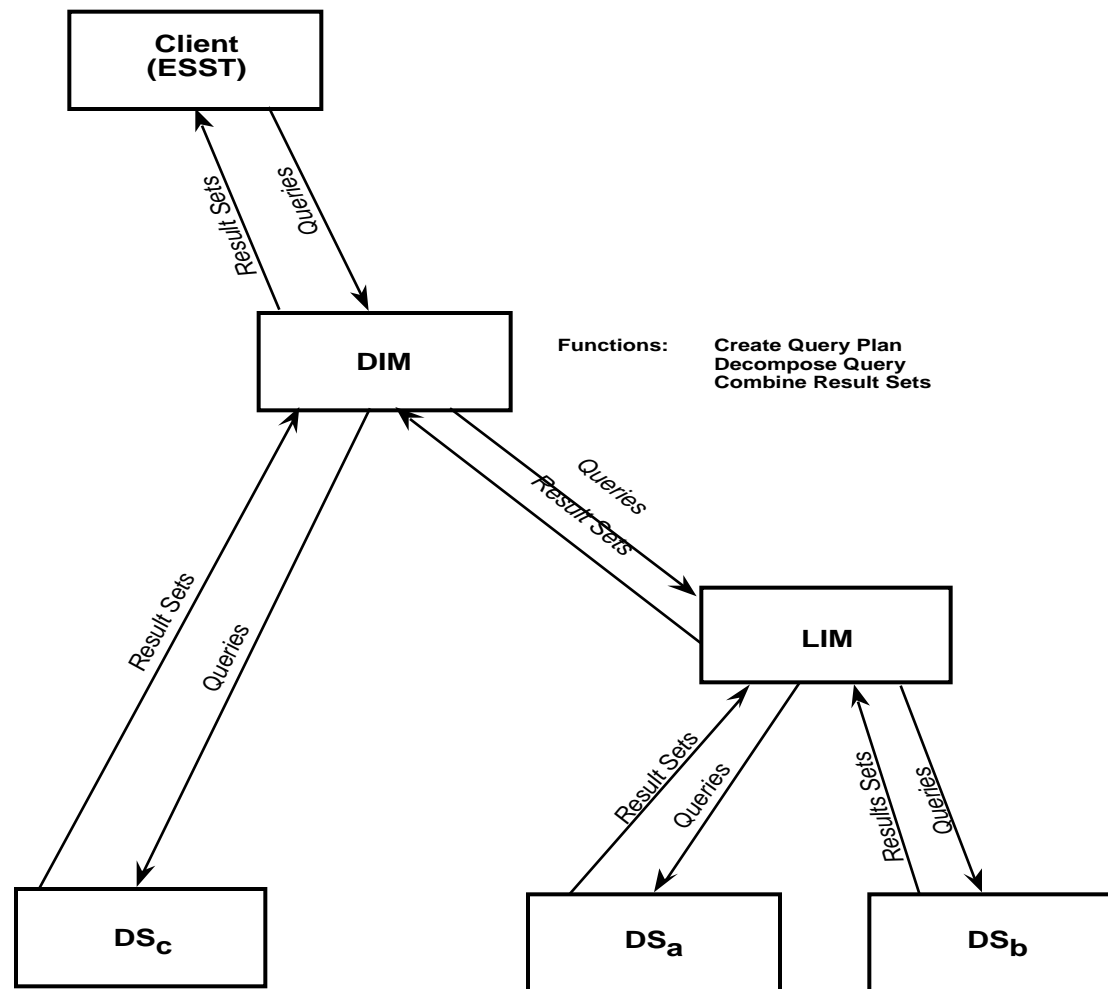
ESQL Trade Study Candidates List

- Relational/Extended Relational Query Languages
 - SQL-92
 - SQL3
 - Illustra DBMS
- Object-Oriented Query Languages
 - ODMG-93
 - Object Management Group (OMG) Object Query Service (OQS)

ESQL Trade Study Candidates List (Continued)

- Relational Data Management Protocols
 - SQL Call Level Interface (CL1)
 - MicroSoft Open Database Connectivity (ODBC)
 - Remote Database Access (RDA)
- Z39.50 Search and Retrieval Protocol
 - Z39.50—1992
 - Z39.50—1995
- Custom Solutions Based on ECS Release A

ECS Data Management System Scenario/Data Flows



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Results of Mandatory Requirements Filter

- SQL 92 and Z39.50-1992 were disqualified
 - Unable to handle spatial data types or operations
 - Unable to add user-defined datatypes and methods
- All Relational Data Management Protocols were disqualified because of lack of support of user-defined datatypes
 - Custom ODBMS protocols are available
 - Use of an extension of OMG's Interface Definition Language (IDL) could provide a solution

Desirable Characteristics

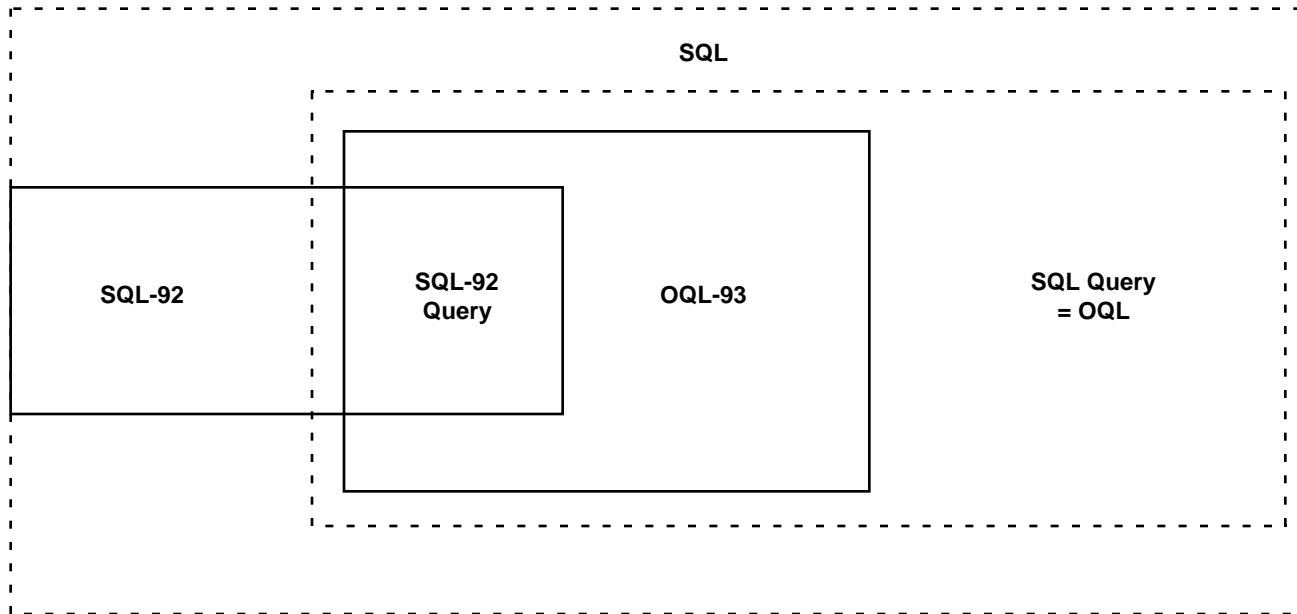
- DC1. Ability to support user-defined datatypes and methods (weight = 10)
- DC2. Ability to combine structurally heterogeneous results sets resulting from a single query (weight = 10)
- DC3. Ability to support query decomposition and optimization (i.e., declarative rather than procedural queries) (weight = 5)
- DC4. Acceptance as an industry, national, or international standard (weight = 7)
- DC5. Available as commercial-off-the-shelf (COTS) software (weight = 8)
- DC6. Compatible with Open Software Foundation's (OSF's) Distributed Computing Environment (DCE) (weight = 8)
- DC7. Reusable by ECS Release C/D design and implementation activities (weight = 5)

Final Ranked Candidates List

	DC1 Weight=10	DC2 Weight=10	DC3 Weight=5	DC4 Weight=7	DC5 Weight=8	DC6 Weight=8	DC7 Weight=5	Summation
OMG OQS	5 (50)	5 (50)	4 (20)	4 (28)	2 (16)	4 (32)	5 (25)	221
ODMG-93	5 (50)	5 (50)	2 (10)	4 (28)	4 (32)	3 (24)	3 (15)	209
SQL3	5 (50)	2 (20)	3 (15)	5 (35)	2 (16)	1 (8)	5 (35)	179
Illustra SQL	5 (50)	2 (20)	3 (15)	3 (21)	4 (32)	2 (16)	3 (15)	179
Z39.50-1995	3 (30)	3 (30)	2 (10)	5 (35)	3 (24)	1 (8)	2 (10)	137
Extended GI Parameter List	2 (20)	2 (20)	1 (5)	0 (0)	0 (0)	5 (40)	1 (10)	95

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Trends in Query Language Standardization



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OMDG/SQL3 Harmonization Activities

Phase	ODMG Changes	SQL3 Changes
1	Add nulls to the ODMG data model; add tables (table emulators) to the model; and add SQL-92-compliant syntax to OQL (includes changing OQL's existing SELECT to SELECT_OBJECT and pointing to SQL-92 to include SELECT	Replace INSTANCE with extent tables
2	Add triggers, views, and constraints (possibly assertions) to the ODMG model; add UPDATE/INSERT/DELETE statements to OQL (with SQL-92 semantics); and add generic function dispatch to OQL	Enhance SQL's triggers to include ADT usage; add "object views" to SQL; specialize function dispatch so that the classic model is used for functions defined inside an ADT definition
3	Ensure that OIDs (that is, surrogates for objects) from an SQL3 database can be "stored" (without interpretation) in an OQL database	If and when interest justifies it, add "free-standing objects" and SELECT_OBJECT to SQL (probably SQL4, if ever); ensure that OIDs (that is, surrogates for objects) from an OQL database can be "stored" (without interpretation) in an SQL3 database
4	Fast-track or otherwise process OQL as an independent standard	As an alternative tack, propose to include the OQL language itself as part of ("as a Part of"?) the SQL standard

Observations and Recommendations

- No obvious choice for the ECS Release B ESQL and underlying data management protocols
- The efforts to harmonize ODMG's OQL and SQL and the OMG OQL definition should be tracked carefully
- Z39.50-1995 should be further evaluated as a prototyping activity